Accuracy and Performance of AIRS on Aqua

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Abstract: The Atmospheric Infrared Sounder (AIRS) and its two companion instruments, the Advanced Microwave Sounding Unit (AMSU) and the Humidity Sounder for Brazil (HSB) were launched into Earth orbit on the NASA Aqua mission on May 4, 2002. The AIRS instrument represents a breakthrough in infrared space instrumentation. The AIRS has 2378 infrared channels in the range of 3.7 - 15.4 microns with a nominal spectral resolution of 1200. The instrument employs cryogenically cooled detectors at 58K, and a passively cooled and actively controlled spectrometer operating at 155K.

The AIRS-AMSU-HSB system is capable of eliminating the effects of clouds on the AIRS infrared radiances (spectrum) in the presence of up to 80% cloud opacity in the AIRS fields of view. From the resulting cloud-cleared infrared radiances we will retrieve temperature and humidity profiles with radiosonde accuracy. The AIRS-AMSU-HSB instrument suite on Aqua is designed to meet both the NOAA operational weather prediction requirements as well as NASA's climate research needs.

The three instrument suite will gather more accurate meteorological information about the Earth's atmosphere and its circulation than ever done before and will reduce the error of the initial sate for weather forecasting by a factor of two. For the first time, a satellite remote sensing instrument is expected to achieve, worldwide, the same accuracy in temperature as currently possible only with direct measurements by balloon-borne sensors. For moisture, however, the accuracy of AIRS-AMSU-HSB will exceed that measured by balloon-borne sensors

The performance of AIRS since launch has been exceptional indicating that the AIRS-AMSU-HSB instrument suite will meet or exceed its objective to deliver

Core Products: Global, Day- Night, Lands-Oceans
Infrared cloud-cleared Spectrum (Radiances)
Atmospheric temperature profiles - 1C/1km
Sea surface temperature: 0.5C
Land surface temperature: 1C
Infrared emissivity ratio
Relative humidity profiles: 20%/1 km

Total perceptible water vapor: 5%
Fractional cloud cover 0.05
Cloud-top pressure and temperature
Cloud spectral infrared emissivity ratio
Total ozone burden of the atmosphere

Research Products:
Total CO2 burden of the atmosphere: 2ppm
CO and CH4 profiles
Precipitation rates
Etc.

At the time of the conference we will have enough results to provide an overview of the AIRS-AMSU HSB remote sounding system, discuss major scientific findings and describe various types of data which will be available